

## ELECTRIC-MOTOR DRIVE DEVICE

~~Prior Art~~

*11 PR+9* *relates to* *a<sup>3</sup>*  
 The invention ~~is based on an electric-motor drive device~~  
 for auxiliary devices in motor vehicles, such as sliding  
 5 roofs, window controls, windshield wipers, and the like, ~~as~~  
~~generically defined by the preamble to claim 1.~~

*disclosed in*  
 In a known drive device of this type ~~German Utility~~  
 Model DE 92 06 269 U1), the cup-shaped or cap-shaped motor  
 housing is slipped onto a cylindrical post of the gear  
 housing; the edge of its cap is covered by an annular flange  
 embodied on the post. Between the edge of the cap and the  
 annular flange, there is a sealing ring.

*another* *disclosed in*  
 In ~~an also~~ known drive device ~~German Patent Disclosure~~  
 DE 25 56 240 A1), the fixation of the gear housing and motor  
 housing to one another is done by providing each housing with  
 a radial shoulder, which after the two housings have been  
 joined together is located spaced apart from and in front of  
 the shoulder of the other housing, and a fastening element  
 that has clamping faces cooperating in wedgelike fashion with  
 20 the shoulders clamps the two housings together.

# Summary

## ~~Advantages of the Invention~~

~~The drive device of the invention having the~~  
~~characteristics of claim 1~~ has the advantage over the prior  
art that production is simplified and thus made less expensive  
by eliminating the shoulders, which have to be formed  
separately on the housings, and the loose fastening element.  
Also eliminated are elements protruding past the outside  
diameter of the housings, so that the requisite installation  
space for the drive device is reduced. The roller-burnishing  
according to the invention assures an improved introduction of  
force from the motor housing to the gear housing and a rigid  
connection between the housings, with a favorable effect on  
noise produced by the drive device. At the same time, by the  
large-area, intimate bond between the housings that is  
attained, an improved heat transfer from the motor housing to  
the gear housing and thus improved heat dissipation from the  
motor are attained. Furthermore, the roller-burnished  
connection brings about good sealing at the transition between  
~~the two housings.~~

~~By means of the provisions recited in the other claims,~~  
~~advantageous refinements of and improvements to the drive~~  
~~device defined by claim 1 are possible.~~

In a preferred embodiment of the invention, the roller-  
burnishing ~~is~~ is performed at two points, longitudinally  
spaced apart from one another, in the slip-on region of the

motor housing onto the gear housing. This creates a very reliable connection, in which for long periods, even under extreme operating conditions, no play can occur between the two housings.

5 In an advantageous embodiment of the invention, the gear housing, in the slip-on region of the motor housing, has an annular groove into which an encompassing annular bead, stamped out of the motor housing by roller-burnishing, protrudes with positive engagement. The provision of the annular groove makes it easier to press the motor housing material into the gear housing, and only much-reduced roller-burnishing forces are required. A good positive engagement connection is created between the annular groove and the annular bead.

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20 Greater strength of this connection is attained whenever, in accordance with an advantageous embodiment of the invention, on the gear housing in the motor housing slip-on region, an encompassing radial shoulder remote from the motor housing is additionally embodied, and the radial shoulder is engaged from behind by an annular collar bent inward from the motor housing by roller-burnishing. The motor housing is then fixed on the gear housing at two spaced-apart points.

*Pro A<sup>5</sup>* Drawing

*Pro A<sup>6</sup>* ~~The invention is described in further detail below in terms of exemplary embodiments shown in the drawing.~~

5 Figs. 1 and 2, each in fragmentary form, show an electric-motor drive device for auxiliary devices in motor vehicles, in accordance with a first and second exemplary embodiment, respectively.

#### Description of the Exemplary Embodiments

005536-002500  
15 The electric-motor drive device, shown in fragmentary form in each of Figs. 1 and 2, for instance for adjusting sliding roofs, window controls, vehicle seats, and the like in motor vehicles, has an electric motor 11 and for stepping down the motor rpm a gear 12, preferably a worm gear. All that can be seen of the electric motor 11 in Figs. 1 and 2 is the motor housing 13 and the stator 14 that is enclosed by the motor housing 13; in a known manner, the stator comprises a short-circuit ring 15 and permanent magnet segments 16 secured to it. All that can be seen of the gear 12 is the gear housing 17 in fragmentary form. The cap-shaped or cup-shaped motor housing 13, also known as a pole pot, is slipped with its opening edge 131 onto the gear housing 17 and roller-burnished into the gear housing 17 in the slip-on region at two longitudinally spaced apart points. An encompassing, angular chamfer 18 is made by turning into the face end 171 of the

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gear housing 17 toward the motor housing 13, and the short-circuit ring 15 is slipped by positive engagement onto the chamfer until its annular end face meets the radial leg face 181 of the chamfer 18. A cap-shaped indentation 19 is  
5 coaxially recessed out of the bottom 132 of the cup-shaped motor housing 13 and serves to receive a bearing for the rotor shaft of the electric motor 11.

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~~In the exemplary embodiment of Fig. 1, in the slip-on region of the motor housing 13, an annular groove 20 on the one hand and an encompassing radial shoulder 21 on the other, which points away from the motor housing 13, are formed in the gear housing 17. By placing a roller-burnishing tool against the motor housing 13 in the region of the annular groove 20, an encompassing annular bead 22 is stamped out of the motor housing 13; it protrudes with positive engagement into the annular groove 20. By placing the roller-burnishing tool against the end portion of the opening edge 131 of the motor housing 13 behind the radial shoulder 21, an inward-bent annular collar 23 is created, which engages the radial shoulder 21 from behind. By means of these two roller-burnishing operations, the motor housing 13 is joined solidly and permanently to the gear housing 17.~~

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~~In the exemplary embodiment of Fig. 2, the annular groove for roller-burnishing in of an annular bead is dispensed with, and instead, an annular rib 24 protruding radially from the outer circumference of the gear housing is machined out of the~~

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cancel.

~~slip-on region of the motor housing 13 on the gear housing 17,~~  
and one annular rib face forms the radial shoulder 21 and the  
other annular rib face forms an extension of the radial leg  
face 181 of the chamfer 18. On its opening edge 131 toward  
5 the gear housing 17, the motor housing 13 is radially widened,  
and once the annular collar 23 that engages the radial  
shoulder 21 from behind has been made, the motor housing is  
~~braced on both annular rib faces of the annular rib 24.~~

In both Figs. 1 and 2, the lower half of the drawing  
shows the state before the roller-burnishing and the upper  
half of the drawing shows the state after the roller-  
burnishing.

As A<sup>7</sup> →